

APPENDIX C

Los Inspection Manual

LOS Inspection Manual



Maintenance/Traffic

Version 05/12

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INDOT Maintenance LOS Manual

1.0 Inspection Program Process

1.1 Introduction

This manual defines the inspection program and criteria for thirteen Maintenance categories.

1.2 Data Collection

The Level of Service (LOS) Survey is a visual inspection, of certain roadway assets, conducted by a walk-through based on criteria defined in this manual. Two teams, consisting of two collectors, are assigned to inspect six Districts' state maintained highways. The inspections consist of 160 0.10 mile random sections in each Subdistrict. The random segments will be identified by route number and GPS coordinates. The inspections should start at given latitude and longitude location and cover 0.10 mile as described in section 1.3. These locations will be provided by the LOS supervisor and shown on the map interface of the inspection software.

1.3 Highway

1.3.1 Divided highways – A LOS inspection will be conducted in both highway directions.

1.3.2 Two-lane highways – A LOS inspection will be conducted in both highway directions.

1.4 Survey Policy During Snow and Ice Operations

A LOS inspection will not be conducted on a route until the pavement is clear. The LOS inspection team will communicate with the supervisor, to establish a course of action until the pavement is clear.

1.5 How INDOT Uses LOS Data

The LOS data provides the information necessary to generate the Organizational Performance Index (OPI). The District OPI is a scoring system index by which system conditions are compared to INDOT goals. Additionally, the LOS data will be used by the District Highway Operations to develop their work plan.

2.0 LOS Recordable Conditions

2.1 Summary of Recordable Deficiencies

2.1.1 Shoulders

Deficiency Description	Deficiency Count
Drop-off or build-up exceeding +/- 2 inches for 15 linear feet on paved shoulders less than 4 feet wide	Each in 1/10 mile (528 feet) segment

2.1.2 Paved Shoulder Cracking

Deficiency Description	Deficiency Count
Unsealed cracks on more than 25% of the shoulder.	Each in 1/10 mile (528 feet) segment

2.1.3 Small Culvert Obstruction

Deficiency Description	Deficiency Count
More than 25% of culvert obstructed	Each culvert in 1/10 mile (528 feet) segment

2.1.4 Underdrain Obstruction

Deficiency Description	Deficiency Count
More than 10% of outlets are closed. Rodent screens are missing. Marking of drain not rated.	Each underdrain in 1/10 mile (528 feet) segment

2.1.5 Ditch Obstruction

Deficiency Description	Deficiency Count
50% or more of ditch filled with debris or standing water 1 inch in depth or greater that covers 6 feet or more. Standing water after a rain is still a deficiency.	1/10 mile (528 feet) segment

2.1.6 Pavement Deterioration

Deficiency Description	Deficiency Count
Rigid pavement – more than 25% of transverse and longitudinal joint material does not appear to keep water out	Each in 1/10 mile (528 feet) segment
Unsealed cracks on more than 25% of roadway Greater than hairline and exceeding 4 feet.	1/10 mile (528 feet) segment

2.1.7 Pavement Failure

Deficiency Description	Deficiency Count
Pavement blow-up exceeding 2 inches	Each in 1/10 mile (528 feet) segment
Pothole exceeding 1 inch in depth	
Rigid pavement spalls – defect exceeding 1 square foot in area and 1.5 inches deep	Each in 1/10 mile (528 feet) segment
Edge raveling exceeding 50 feet in length	1/10 mile (528 feet) segment

2.1.8 Bridge Category

Deficiency Description	Deficiency Count
1 plugged drain	Each
Expansion joint with rubber seal missing or pulled out to a vertical offset exceeding 1.5 inches	Each
1 square foot of delaminated, spalled, or cracked deck	Each
Sand or debris around bearings	Each

2.1.9 Guardrail

Deficiency Description	Deficiency Count
More than one rail panel damaged more than 75%	
Spacer block – rotting or missing block-out	Every 3 continuous block-outs
Two or more consecutive posts missing or rotten	

2.1.10 Cable Barrier

Deficiency Description	Deficiency Count
Cable sagging more than 1/3 of post height	1/10 mile (528 feet) segment
More than 1 post knocked down	Each in 1/10 mile (528 feet) segment

2.1.11 Crash Attenuator

Deficiency Description	Deficiency Count
Damaged or missing	Each in 1/10 mile (528 feet) segment

2.1.12 Sign

Deficiency Description	Deficiency Count
Damaged or faded sign, cannot be clearly read	Each in 1/10 mile (528 feet) segment
Missing sign, excluding 3-button “no passing zone” indicator post	Each in 1/10 mile (528 feet) segment
Sign is older than policy age (currently 18 years) (older stickers no year punched)	Each in 1/10 mile (528 feet) segment
Missing or damaged mile markers or reference posts	Each in 1/10 mile (528 feet) segment

2.1.13 Pavement Marking

Deficiency Description	Deficiency Count
Excess of 150 linear feet missing	1/10 mile (528 feet) segment

2.1.14 Special Marking

Deficiency Description	Deficiency Count
A total of one half of all markings are missing 50% of the marking on main line or at signalized approaches, stop bars, or cross walks (no stop bars on county road approaches unless at signal)	Each in 1/10 mile (528 feet) segment

2.1.15 Maintenance Work Plan Analysis

Deficiency Description	Deficiency Count
The PM activities will be evaluated comparing the planned versus the actual.	Score assigned to individual PM activities, and then scores are averaged for Sub and District scores,

2.1.16 Traffic Work Plan Analysis

Deficiency Description	Deficiency Count
The PM activities will be evaluated comparing the planned versus the actual.	Score assigned to individual PM activities, and then scores are averaged for Sub and District scores,

2.2 Description of Recordable Deficiencies

2.2.1 Deficiency Type: Shoulders

Deficiency Description: Drop-off or build-up from the paved surface exceeding +/- 2 inches in depth and 15 linear feet in length on paved shoulders less than 4 feet wide.





2.2.2 Deficiency Type: **Shoulder Cracking**

Deficiency Description: Unsealed cracks on more than 25% of the shoulder.



2.2.3 Deficiency Type: **Small Culvert Obstruction**

Deficiency Description: Culvert more than 25% obstructed. One deficiency will be recorded for each culvert.

Inspection Limits: INDOT right-of-way excluding ramps



2.2.4 Deficiency Type: **Underdrain Obstruction**

Deficiency Description: More than 10% of outlets are closed and/or unsuitably marked. Rodent screens are missing or torn.

Inspection Limits: INDOT right-of-way excluding ramps.



Plugged underdrain, missing rodent screen



Missing rodent screen



Plugged underdrain

2.2.5 Deficiency Type: **Ditch Obstruction**

Deficiency Description: 50% or more of a ditch is filled with debris or there is standing water 1 inch in depth or greater that covers 6 feet or more.

Note: Cattails will not be recorded as a deficiency.

Inspection Limits: INDOT right-of-way excluding ramps.



Debris obstructing 50% of
ditch cross-section



Standing water



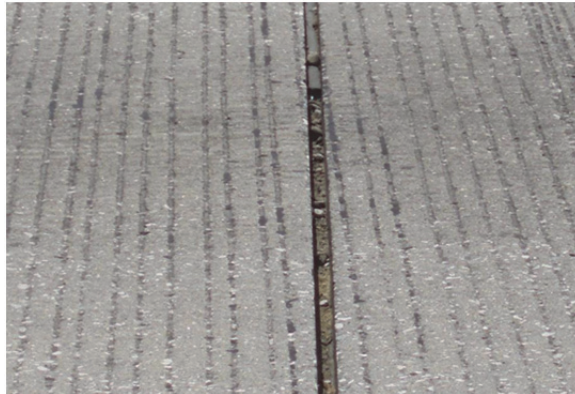
Good Ditch Line

2.2.6 Deficiency Type: **Pavement Deterioration**

Deficiency Description: More than 25% of the roadway has unsealed **cracks**.



Rigid Pavement – 25% of transverse and longitudinal joint material does not Appear to keep water out.



2.2.7 Deficiency Type: Pavement Failure

***Any of the following four criteria causes the pavement to be deficient.

Deficiency Description: **Pavement blow-up** exceeding 2 inches. One deficiency will be recorded for each blow-up.



Pothole – exceeding 1 inch in depth.



Rigid Pavement Spalls – defect exceeding 1 square foot in area and 1.5 inches deep



Edge Raveling – exceeds 50 feet in length.



2.2.8 Deficiency Type: **Bridge Category**

***Any of the following four criteria causes the Bridge to be deficient.

Drains – 1 plugged drain



Expansion Joint – rubber seal missing or pulled out to a vertical offset exceeding 1.5 inches



Deck Patching – 1 square foot of delaminated, spalled, or cracked deck patching



Bearings – sand or debris around bearing



2.2.9 Deficiency Type: **Guardrail**

***Any of the following three criteria causes the guardrail to be deficient.

Guardrail – More than one rail panel is damaged more than 75%



Crushed rail panel



Double sided rail: Two rail deficiencies

Note: Post deficiencies exist beyond the two damaged rail panels.

Spacer Block – rotting or missing block-out. Every 3 continuous block-outs.



Posts – two or more consecutive posts missing or rotten



Missing posts



Post rot exceeding 50% of cross-section



2.2.10 Deficiency Type: Cable Barrier

Deficiency Description: Cable sagging more than 1/3 of post height **or** more than one post knocked down.





2.2.11 Deficiency Type: **Crash Attenuator**

Deficiency Description: Crash attenuator is damaged or missing.





2.2.12 Deficiency Type: Sign

- Sign is damaged or faded (it cannot be clearly read).
- Sign is missing, excluding 3 button “no passing zone” indicator post.
- Sign is older than policy age (currently 18 years).

Inspection Limit: All INDOT signs excluding TODS, LOGO, utility marker, and ramp signs.



Multiple element sign: No deficiencies were recorded. A total of 5 multiple element signs were inspected. WEST 22 with the left turn arrow represents one of the multiple element signs. If all 5 of the multiple element signs were significantly faded or could not be clearly read then a deficiency would be recorded.



Sign significantly faded



Damaged sign



Missing sign



Sign older than policy age

2.2.13 Deficiency Type: Pavement Marking

Deficiency Description: Excess of 150 feet missing in the segment.



Pavement center line covered in excess of 150 linear feet



Pavement edge line covered in excess of 150 linear feet

2.2.14 Deficiency Type: **Special Marking**

Deficiency Description: A total of one half of all markings are missing 50% of the marking on main line or at signalized approaches, stop bars, or crosswalks.



More than 50% missing/faded



More than 50% missing/faded